

## ***Sensation, Sensory Integration and Seating and Access***

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### **I. Old Paradigms we need to leave behind**

- A. Access issues with children are to be assessed first in order to use AT
  - 1. “Access” is the last, not the first
  - 2. Child must know activity
    - a. The machine, how it works
    - b. The software the machine controls, The real activity
    - c. How a method of access works, by seeing it work first
    - d. Beginning, middle and end of activity
    - e. Repeating the activity in frequency, rather than in length of time
  - 3. In children, switch sites develop, and the number of them can increase
  - 4. Scanning can lead to direct selection (2 switch, 3 switch, Head mouse)
  - 5. Direct selection and scanning can both be used, simultaneously and task specifically
- B. Seating for function is to be restrictive, controlling the body
  - 1. Seating must allow for task participation and performance
  - 2. Seating must provide pelvic weight bearing for visual convergence
  - 3. Seating must be situationally specific, task specific and change
- C. Consistent switch site/s exist and are to be “found” in assessment before AAC/AT device assessment can occur
- D. Hands should always be the first “site” of choice tried. . .
- E. Find an OPTIMAL site

### **II. Theoretical Review (neurophysiological) as relates to tasks**

- A. *Neurodevelopmental Treatment (NDT)*
  - 1. Cephalo-caudal development
  - 2. Key points of movement; Shoulder and Pelvic girdle
  - 3. Co-contraction and Co-activation
  - 4. Developing righting and equilibrium by inhibiting primitive reflexes
- B. *Focus of Characteristics of Motor Behaviors*
  - 1. Initiating and Isolating independent movements/Voluntary control
    - a. Require Transition
    - b. Require Intention
    - c. Require seating which includes mobility, and pelvic weight bearing
  - 2. Endurance and Fatigue
    - a. “Read” body fatigue as “cognitive” fatigue as with all children
    - b. Movement is required
  - 3. First extremity is always the “HEAD”
    - a. Hands or upper extremities have no power without body control, trunk control, and lower extremity weight bearing
    - b. Hands must be in view of eyes
    - c. What is “eye-hand” coordination?
- C. *Sensory Integration; “self initiated, self modulated and self controlled”*
  - 1. The Body’s processing systems
    - a. Tactile processing, body is “resting”
    - b. Vestibular processing, the body is “active”

2. Kinesthetic and Proprioceptive Sense
3. Coordinated Visual Sense
4. Motor Planning, what is this really?

**D. Physiological Process of movement**

*ALWAYS based on body's need to SURVIVE and PROTECT itself. Moving within its sensory systems, primarily utilizing the tactile system and the vestibular system.*

1. Initiation of motor acts, new patterns vs. automatic ones
2. Transitional patterns, a precursor to isolation of movement
3. Equilibrium reactions and postural security (a personal relationship to gravitational forces) are developed through active/dynamic and independent movement, & are dulled by lack of movement.
4. Impact of independent mobility & cognitive exploration & understanding
5. Stability, is an active "holding on"
6. Consistency in process of movement is based on sensory information and repetition
7. Importance of routines, for predictable anticipation of motor acts
8. Importance of novelty, for consistency development
9. Repetition of act. vs. repetition of activity
10. Isolated patterns develop through functional demand and use (cognitive and emotional), NOT from "motor" or "visual-motor" practice.

**E. Motor/Muscle Tone, varies with diagnostic category**

1. Cerebral palsy, quadraplegia, hemiplegia, diplegia
  - a. Spasticity, Athetosis, mixed
  - b. Dystonia, Ataxia
  - c. Rigidity
2. Hypotonicity vs. hypertonicity: really tactile processing vs. vestibular processing or "a non-weight bearing" pelvis
3. Other Central Nervous system disorders
4. Progressive disabling diseases  
e.g. Spinal Muscular Atrophy, m. dystrophy, arthrogryposis, osteogenesis imperfecta
5. Traumatic Brain injury

**F. Seating for Postural Management; what we do to "manage" a child's body, imposed seating**

1. Safe, passive Transport
2. Being fed by another person, swallowing
3. Body stillness, relaxation is necessary
4. Primarily demands use of the tactile system
5. Needed when body is to be receptive

**G. Seating For Postural Control, what is needed for the child to control her body, situationally specific**

1. Independent control of movement
2. Pelvic stability (mobility) is critical
3. Using weight bearing, especially pelvic and lower extremity
4. Primarily demands use of the vestibular system
5. Needed when body is to be active

**H. Learning Styles and Learning Theory**

1. Mastery of adaptation, development of mastery
2. Assimilation, Accommodation, Construction, & Conservation
3. Auditory, Visual, & Combo
4. Cognitive conscious, Limbic emotional
5. Interest driven, curious, talents

6. Assumption of Competence
7. Development is NOT hierarchical, but multi-levelled, simultaneously functioning and changing & maintaining
8. We are all “learning disabled” or have “sensory processing problems” at any given time, as we all have sensory impairment & sensory disorganization
9. Lack of experience, enhanced anxiety
10. Speed of learning based on task, and all above and is individual
11. Different tasks have different demands

*Generalization is never as easy as behaviorists would like us to believe, if a motor task is a process, only the process approach can reassure us, e.g. a joystick does not mean it will work in every situation & the converse of this is true also: a switch used for momentary acts will NOT be confused as the same switch for a continued action task, the TASK defines the motor act, NOT the ACCESS method.*

### Summary of Issues so Far

- A. *Understanding CP/Tone Problems*
  1. Tone Management/Relaxation
  2. Use and Knowledge of Body Postures
  3. Sensory Integration inexperience
  4. “Primitive” Reflexes and their use
  5. Opisthotonic Reaction/Startle Reflex
  6. Obligatory Reflexes/Extensor spasm
  7. “like Layers of an onion”
- B. *Real Problems/Real Change*
  1. Seating for safe, passive transport
  2. Use of footrests/ and of floor placement
  3. Seat to Floor height of wheelchairs
  4. Anti-thrust seat/wedged seat
  5. Chest straps/thick, swingaway trunk laterals
  6. Non-adjustable hip guides and/or Pommels

### **III. Intervention/Teaching/Assessment Strategies**

- A. *Observation of child NOW*
  1. Postural Insecurity
  2. Interest of Activities
  3. Independent control
- B. *Seating and Positioning, NOW and what to CHANGE*
  1. How many seats/positions experienced?
  2. How do transitions occur?
    - a. Adult physically managed
    - b. Adult verbally managed
    - c. Communication initiates, child directed
    - d. Child managed
  3. Play equipment vs. Work/Travel Equipment
  4. Seating for postural management
  5. Seating for postural control
- C. *Mobility*
  1. In what situations
  2. Powered chair/mobility within activity
  3. Enjoyment of movement, controlled by child, perhaps “not” best therapeutic position
- D. *Play*

1. Control of choices
  2. Control of objects
  3. Fluid materials experience
  4. Body interactions
- E. Beginning, Middle & End of activities, signaled How?*
- F. Seating Changes to be made*
1. Treatment Techniques
  2. Sensory Integration/Postural Insecurity
    - a. Use of Anterior Tilt
    - b. Use of “Barrier” Plastazote vest
    - c. Use of Pelvic weight bearing
    - d. Use of weight bearing, feet on floor
  3. Understanding the Child’s Use of her Tone/especially “driving from the pelvis”; pushing against headrest/footplates; extensor “thrust/spasm”
  4. Opisthotonic reactions, “hyper-extension”  
Caused by touch/pressure at occiput, scapulae or sacrum; or near one or all of these)
  5. A protective reaction, from opisthotonic reaction to ATNR, to neutral
  5. Startle reactions
  6. Working with child OUT of chair
  7. Adding seating changes to specific task participation
    - a. High interest tasks
    - b. Everyday, functional tasks (eating/transfers)
    - c. Developing Seating Tolerance
  8. Seating must be Task specific, situationally specific
  9. Transfer Techniques, ceiling track lift systems
- G. Handling Strategies*
1. Structure of Environment
    - a. Stimulating, yet not overwhelming
    - b. Task Oriented
    - c. Interaction Oriented
    - d. Signals for Transition of Activities throughout the Day
  2. Communication style used with child
    - a. Waiting for child
    - b. Child using body as cues
    - c. Child interpreting environment
    - d. Structuring activities/communication
  3. Child Learning Daily Schedule of Events
    - a. Mastering Anticipation
    - b. Mastering Control of activity
    - c. Mastering Environment through mobility
  4. As relates to Assistive Technology
    - a. Multiple Methods of Access
    - b. Head and Hands
    - c. Everything is scanning
    - d. Creating environment with multiple access
    - e. Use of equipment by All folks, including teachers

#### **IV. Shared Case Studies**

#### **Interesting Further Reading:**

*This is not a bibliography, as I have shared with you, instead my own understandings and musings as a treating therapist who has had so many wonderful children as a part of my*

*clinical life. However, I do attempt to base my observations, thoughts, and attitudes not only on experience but also on current and past readings, and studies of others. These books I have found particularly helpful to me, I offer them to you for further study yourself, if you so choose. This is by no way a comprehensive list, but rather a good beginning.*

**1. Clinical Assessment and Training Strategies for the Child's Mastery of Independent**

**Powered Mobility** By Karen M. Kangas OTR/L, 2000, booklet can be purchased directly from author (by check or money order to Karen M. Kangas OTR/L, for \$18.00 includes S&H)

**2. Sensory Integration, Theory and Practice** by Anne G. Fisher ScD, OTR, Elizabeth A. Murray, ScD, OTR and Anita C. Bundy, ScD, OTR copyright 1991; published by F. A. Davis Company, Philadelphia OR (I think this has replaced it, but I like first edition best)

**Sensory Integration, Theory and Practice, 2<sup>nd</sup> edition**, By Bundy, Anita; Lane, Shelly; Murray, Elizabeth, ISBN ; 0545-5 from F.A. Davis Company, 1-800-323-3555; [www.fadavis.com](http://www.fadavis.com)

**3. Understanding the Nature of Sensory Integration with Diverse Populations** by Susanne Smith Roley, Erna Blanche, and Roann Sc. Schaaf from Harcourt Publishing; [www.psychcorp.com](http://www.psychcorp.com)

**4. Sensory Integration and the Child** by A. Jean Ayres from Harcourt Publishing (previously Therapy Skill Builders); [www.psychcorp.com](http://www.psychcorp.com) (Dr. Ayres wrote this book for parents)

**5. Early Diagnosis and Intervention Therapy in Cerebral Palsy** edited by Alfred Scherzer, 2001, ISBN: 0-8247-6006-9, Marcel Dekker, Inc., New York, Basel; [www.dekker.com](http://www.dekker.com)

**6. Prescriptive Seating for Wheeled Mobility, Vol. 1, Theory, Application and Terminology**, By Diane E. Ward, M.Ed., OTR, Published by: Healthwealth International, 517 NW 103 Avenue, Ft. Lauderdale, FL 33324-1625; [www.hlthwlth.com](http://www.hlthwlth.com) ; 954-472-0517

**7. Ergonomic Seating, A True Challenge; Wheelchair Seating and Mobility Principles**, By Bengt Engstrom, P.T., Published by: Posturalis Books, Sweden, copyright, 2002  
Email: [engstrom@posturalis.com](mailto:engstrom@posturalis.com)

**8. Occupational Therapy for Children**, 4<sup>th</sup> edition, edited by Jane Case-Smith, Chapter 20, "Mobility", (By Christine Wright-Ott), 2001, published by Mosby, Inc.

**9. Sensory Integration and learning disorders** by A. Jean Ayres, copyright 1972, Los Angeles: Western Psychological Services (can be obtained at [www.amazon.com](http://www.amazon.com) too)

**10. The Child's Conception of the World**, by Jean Piaget (1969), Littlefield, Adams & Co., Totowa, New Jersey (can also obtain from [www.amazon.com](http://www.amazon.com) )

**11. The Origins of Intelligence in children** by Jean Piaget (1952) New York: W. W. Norton

**12. The Mechanisms of Perception** by Jean Piaget (1969), New York: Basic Books

**13. Any papers, monographs or articles by Berta Bobath, by T. Berry Brazelton, Eric Ericson (Child in Society, the Development of Autonomy), Any other book or article written by A. Jean Ayres**

**\*\*\*Important Web-site** for information regarding all Movement Disorders;

[www.wemove.org](http://www.wemove.org) (Stands for Worldwide Movement Disorders) found it particularly helpful in understanding "dystonia" and other medical descriptions in more detail. Hope you enjoy it too.